1 Right Triangle Trig Review

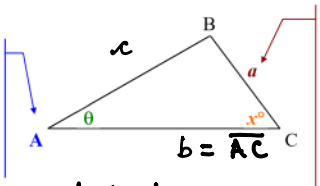
January 5, 2019 5:31 PM

FOM 11 Ch 3/4 – Day 1: RIGHT TRIANGLE TRIGONOMETRY (REVIEW)

TRIANGLES

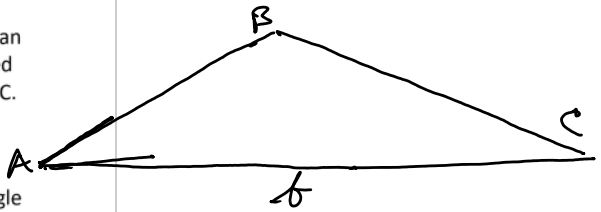
Capital letters at vertices.

- ∠A is the angle.
- A is the angle's measure.
- ∠A = ∠BAC =
- θ = "theta"



sides: a, b, c.

- The lower case letter corresponding to the opposite vertex represents the length of the side.
- The side's length can also be represented by its endpoints, BC.



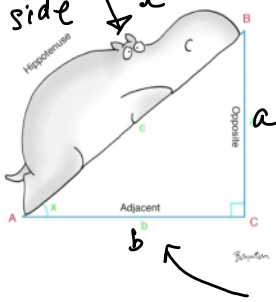
Triangle Properties

- sum of angles =
- longest side is opposite the largest angle; shortest side is opposite the smallest angle

Right Triangle Properties

- Right triangle:

hypotenuse: longest side, always opp 90°, c



a, legs, b

- *Pythagorean Theorem*:

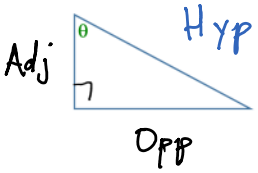
$$a^2 + b^2 = c^2$$

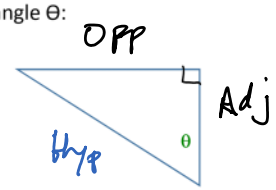
$$c = \sqrt{a^2 + b^2}$$

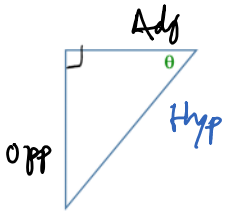
- *We can also use sine, cosine, and tangent* to find sides and angles.

beside

Example 1: Identify the HYPOTENUSE (hyp), ADJACENT (adj), and OPPOSITE (opp) sides in each triangle with respect to angle Θ:







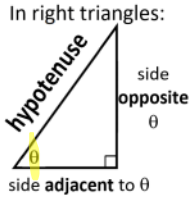
PRIMARY TRIGONOMETRIC RATIOS

SOH CAH TOA

$\sin\theta = \frac{Opp}{Hyp}$ $\cos\theta = \frac{Adj}{Hyp}$ $\tan\theta = \frac{Opp}{Adj}$

She Offerred Her Cat A Heaping Teaspoon of Acid

In right triangles:

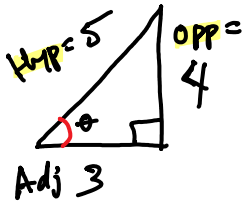


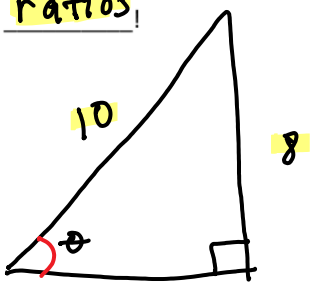
sine of angle θ, $\sin\theta = \frac{\text{length of side opposite } \theta}{\text{length of hypotenuse}}$

cosine of angle θ, $\cos\theta = \frac{\text{length of side adjacent } \theta}{\text{length of hypotenuse}}$

tangent of angle θ, $\tan\theta = \frac{\text{length of side opposite } \theta}{\text{length of side adjacent to } \theta}$

Sin, cos, and tan are really ratios!





$\sin\theta = \frac{Opp}{Hyp} = \frac{4}{5}$

$\sin\theta = \frac{8}{10} = \frac{4}{5}$

sin ratios are same!

CALCULATOR USE: Be sure your calculator is in **DEGREE MODE** !

Determining the trigonometric RATIO value of a given angle

cos 50°: COS 50 = ∴ cos 50° ≈ 0.6428

Determining the ANGLE measure from a given trigonometric value

$\sin\theta = 0.75$; $\theta = \sin^{-1}(0.75)$ $\quad \theta = \sin^{-1}(0.75)$

2^{nd} function | $\sin^{-1}$ | sin | 0.75 | = ∴ $\theta \approx 48.59°$

↑ "inverse sine" "arc sine"

Give 4 decimal place for sin, cos & tan

Example 2: Evaluate each trigonometric ratio, to four decimal places.

a) cos 89° ≈ 0.01745 = 0.0175 b) tan 42° ≈ 0.9004 c) sin 45° ≈ 0.7071

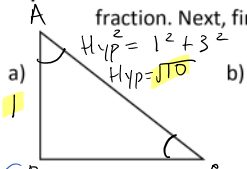
Example 3: Find the *angle* given the trig ratio.

a) cos Θ = 0.1 $\quad \theta = \cos^{-1}(0.1) = 84.260°$

b) tan Θ = 2.5 $\quad \theta = \tan^{-1}(2.5) = 68.20°$ 68.198

Example 4: Determine the value of each trigonometric ratio. Express the answer as a fraction. Next, find the angle.

a)



$Hyp^2 = 1^2 + 3^2$, $Hyp = \sqrt{10}$

SOHCAHTOA

$a^2+b^2=c^2$, $1^2+3^2=c^2$, $\sqrt{c^2}=\sqrt{10}$, $c=\sqrt{10}$

$\tan A = \frac{Opp}{Adj}$

$\tan A = \frac{3}{1} = 3$

$A = \tan^{-1}(3) = 72°$

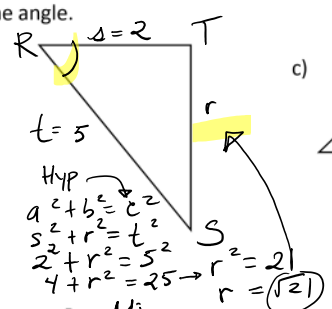
$\cos C = \frac{Adj}{Hyp}$

$\cos C = \frac{3}{\sqrt{10}}$

Shift cos (3

$C = \cos^{-1}\left(\frac{3}{\sqrt{10}}\right) = 18°$

b)



Hyp

$a^2+b^2=c^2$, $s^2+r^2=t^2$, $2^2+r^2=5^2$, $4+r^2=25 \rightarrow r^2=21$, $r=\sqrt{21}$

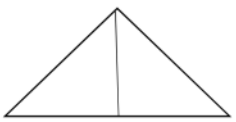
$\cos R = \frac{Adj}{Hyp}$

$\cos R = \frac{2}{5}$

$R = \cos^{-1}\left(\frac{2}{5}\right) = 66°$

$\sin R = \frac{Opp}{Hyp} = \frac{\sqrt{21}}{5}$

c)



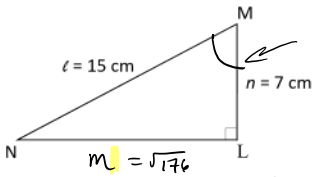
$\sin\Theta$

$\tan \angle MLN$

SOLVING RIGHT TRIANGLES

When *solving triangles*, find all the unknown side lengths and angle measures.
Use triangle properties and trigonometry.

Example 5: In ΔMNL; L = 90°, ℓ = 15 cm, and n = 7 cm. Solve ΔLMN. Answer to the nearest tenth of a degree or hundredth of a cm when necessary.



62°

1) Find m: $\ell^2 = m^2 + n^2$
$15^2 = m^2 + 7^2$
$225 = m^2 + 49$
$-49 \quad -49$
$176 = m^2$
$m = \sqrt{176}$

3) Find ∠N:
∠N = 180° − 62° − 90°
∠N = 28°

SOHCAHTOA

2) Find M: $\cos M = \frac{Adj}{Hyp} = \frac{7}{15}$

$M = \cos^{-1}\left(\frac{7}{15}\right)$

$M = 62°$

Assignment: Right Triangle Trigonometry Review Worksheet